

**CONFIDENTIAL**

7-185

11 July 1957

**MEMORANDUM FOR: THE RECORD**

**SUBJECT : Project visit to**

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1. TIME AND PLACE OF MEETING: The meeting was held 10 July  
at .

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2. ATTENDANCE:

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3. DISCUSSION:

a.  was asked to investigate on a breadboard basis what would be the best way to design the input circuit of power supply-matching unit to minimize hum that comes in from unshielded microphone wires. The present input circuit is single ended with respect to the chassis ground (although with respect to an earth ground, a balanced circuit can be set up) and in all probability this will be changed to some sort of transformer input with a balancing hum potentiometer. The problem was posed that  should investigate hum elimination using 100-200 feet of tripple stranded #40 formvar wire supplied by the undersigned as the mike wire between the Type CA unit and the matching box. The mike wire should be run so that it encounters stray noise fields such as that from flourescent lights, electric machinery, etc. The results of this investigation will be in the form of a report recommending changes in the design of the present matching unit.

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As regards the general subject of minimizing hum pickup,  was asked to consider what could be done to the output circuit of the microphone itself to minimize pickup. The possibilities of a transformer output from the microphone should be investigated both with 2 and 3 wires running from the microphone. The 3 wire case was to be considered because if some substantial increase in performance can be obtained using a 3 wire system, the undersigned felt that there was really no fundamental limitation as regards wire concealment to eliminate this technique from consideration.

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b. [ ] reported (in the absence of [ ] that the prototype 3 dimensional line element array has been completed and that preliminary pattern curves indicated that its performance was close to theoretical predictions. No listening tests had been conducted on it to date.

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c. [ ] reported on the wireless hearing device. The big problem remaining is developing a sensitive enough acoustics transducer. To date, his effort with a magnetic type unit is far too insensitive to be practical. The size of the diaphragm being limited to .2" diameter and also the lack of cubic volume in which to wind higher impedance coils and place magnets are the factors which limit the device. In view of this, it was agreed that [ ] after exhausting techniques (including an investigation of crystal transducers) applicable to a .2" diameter unit which would fit entirely within the ear canal, would investigate what could be done with a larger size device. The unit would still have to fit into the ear but not entirely in the ear canal. Some portion of it could be located in the ear lobe (not protruding). A possible configuration that would allow for a larger diaphragm would be---

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d. The assembly and final adjustment of the 80 channel noise reducer has been completed. A by-pass circuit which has the same pass band as the noise reducer circuit has been constructed. Tests on the noise reducer have been run with speech mixed with flat noise and speech mixed with simulated room noise. [ ] adjusts the mixture of speech and noise until he feels it is barely intelligible. Through the by-pass circuit (700-3200 cps). The same composite signal is then fed to the noise reducer at different threshold levels. It has been found that when the maximum of the composite signal is about 5 db above the threshold, some speech components are passed free of noise. However, the information obtained in the components is not sufficient to provide speech intelligibility. The composite signal level had to be raised to 20-25 db above threshold for maximum intelligence. At this level both speech and noise are passed by the noise reduction circuit. In order to maintain a more constant level for the maximum amplitude of the composite signal, a compressor circuit was added between the mixing amplifier and the noise reducer.

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[ ] plans to investigate the effect of the following:

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(1) Include more low frequency channels (200-700 cps in 30 steps)

(2) Sharpen up the bandwidth of the channels. Although more information between channels will be lost he hopes to eliminate more noise than speech.

(3) Change the shape of the input-output threshold circuit.

8. [ ] mentioned that [ ] had been doing work for Signal Corps for the past two years on a non-silicon solar battery. The hope being that a cheaper, efficient, more easily applied solar battery could be developed. Recent development has indicated the possibility of getting higher voltaic cells than those possible from silicon. However, the question of power availability still remain to be looked into. [ ] inquired if APD might be interested in supporting this program (the Signal Corps future support is questionable at this time). The past effort has been about \$100,00/year but [ ] indicated that a reduced effort was feasible if desired. The Signal Corps contract No. is DA36-039-8064643-XXXX at Fort Monmouth [ ], Solid state devices) is handling the project.

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